

ON A COLLECTION OF MAMMALS MADE BY MR. J. T. TUNNEY IN ARNHEM LAND, NORTHERN TERRITORY OF SOUTH AUSTRALIA.

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BY the kindness of the Hon. Walter Rothschild I have been privileged to work out the large collection of Mammals made by Mr. J. T. Tunney in Arnhem Land during 1902 and 1903. This is a region hitherto very badly represented in the British Museum, and Mr. Tunney's fine series is therefore of special interest.

With regard to novelties, it so happens that a young Norwegian, Mr. Kaut Dahl, made, in 1894-96, a large collection of Mammals for the Christiania Museum in very much the same region as the present series comes from, and these were worked out by Dr. R. Collett, by whom several new forms were described,* the most noticeable being the remarkable Rock-Phalanger *Pseudochirus dahl*. Dr. Collett's paper contained thirty-one species, and to these Mr. Tunney has added three new ones, the striking black Kangaroo, *Macropus bernardus*, *Mus tunneyi*, and *Phascogale bella*. To certain of the other forms obtained by both collectors I have thought it necessary to give new names, while Mr. Tunney's series of the Rock-Wallaby hitherto known as "*Petrogale*" *concinna* has enabled me to make some observations on its dentition, necessitating its separation as a distinct genus.

Thanks to Mr. Rothschild's generosity, the British Museum has been permitted to retain a practically complete set of the specimens, while another series will be preserved in the Perth Museum, Western Australia, by whose curator, Mr. Bernard Woodward, Mr. Tunney's expedition was arranged.

1. *Pteropus scapulatus* Peters.

♂ 688. ♀ 687. South Alligator River.

2. *Canis dingo* Blum.

Two males. South Alligator River.

3. *Conilurus hirsutus* Gould.

♂ 1368, 1406, 1413, 1414, 1417, 1422, 1424, 1471, 1472, 1473, 1474. ♀ 1415, 1418, 1419, 1421, 1423, 1468, 1470, 1475, 1476. South Alligator River.

4. *Conilurus macrurus* Peters.

♂ 1139. ♀ 88. Nellie Creek, and two specimens unlabelled.

This magnificent Jerboa-rat had not been previously represented in the British Museum.

I see no reason to doubt that Ramsay's *Hapalotis boweri* is synonymous with Peters's *H. macrurus*. The type of the latter is said to have been in changing pelage, and the short fresh hairs of the back to be "glänzend rostbrann," a colour

* P. Z. S. 1897. p. 317.

which is characteristic of the species, but is not shown in the figure. The brown metapodials of the plate are apparently incorrect, as judged by Peters's statement "*manibus pedibusque albis*."

5. *Conilurus penicillatus* Gould.

♂ 1363, 1365, 1366, 1371, 1373, 1375, 1377, 1381, 1389, 1391, 1394, 1395, 1399, 1406, 1408, 1409, 1412, 1425, 1427, 1487. ♀ 1361, 1364, 1367, 1369, 1374, 1376, 1378, 1379, 1380, 1383, 1384, 1385, 1387, 1392, 1393, 1397, 1398, 1426, 1507, 1508. South Alligator River.

"Caught in long grass on plain during day." "Caught in hollow tree."—J. T. T.

About one-third of these specimens have the terminal inch or more of the tail prominently contrasted pure white. There are no intermediate specimens, and it would be natural to suppose that the white-tailed form was specifically different from the black-tailed one, but in all other respects, in size, colour, and skull-characters, the two agree so precisely that in the absence of any evidence as to their local segregation, I am compelled to follow Dr. Collett's example and place them all under one heading.

Gray's *Hapalotis hemileucurus*† would appear to represent the white-tipped form.

6. *Mus tunneyi* spec. nov.

♀ 685. Mary River; and two unlabelled specimens.

A medium-sized rat, with a short tail and whitish belly.

Size rather less than in *Mus rattus*. Form stout and strong. Fur thin, not spinous; hairs of back about 9-10 mm. in length; a certain number of longer piles, about double this length, present on the posterior back. General colour above uniform sandy buffy, rather darker along the dorsal area, clearer along the sides; the slaty bases of the hairs showing through. Undersurface white, or creamy white, the hairs white to their bases; line of demarcation on sides not strongly defined. Head like body. Ears rather short; pale brown, not contrasting with the general colour. Outer side of limbs like body, inner like belly; upper surface of hands and feet white. Tail short, hardly longer than the body without the head, fairly well haired, its rings of scales about 10 to the centimetre; dark brown above, scarcely lighter below.

Skull broad and stoutly built, almost suggesting that of a small *Nesokia*. Muzzle short, nasals not hiding the incisors from above. Interorbital region narrow, its edges with a well-defined upturned bead which is continued back across the parietals, where it is evenly convex outwards, to the outer corners of the interparietal. Palatal foramina not widely open, extending back to the level of the anterior lamina of m^1 ; hinder edge of palate level with the back of m^3 . Bullae unusually large and swollen, evenly rounded. Molars broad, with well-defined tubercles; m^2 with a large antero-internal supplementary cusp, and a rudimentary antero-external one; m^3 with a large antero-internal one.

Dimensions of the type, measured in skin: Head and body, 150; tail, 105; hindfoot, s.u., 30; ear, 18 mm.

Skull, greatest length 36; basilar length, 31; greatest breadth, 20.3; nasal length, 12.3; interorbital breadth, 5.2; greatest divergence of parietal ridges, 13.5;

* *P. Z. S.* 1857. p. 243.

palate length, 17; diastema, 10; palatal foramina, 7.4; length of bullae, 9.5; length of upper molar series, 7.3 mm.

Hab. Mary River, Northern Territory.

Type: Female. No. 685. Collected September 13th, 1902, by Mr. J. T. Tunney, in recognition of whose excellent collecting work the species is named.

This stoutly built short-tailed rat may be readily distinguished from any of its Australian allies by its proportions and its white belly, most of the species having grey bases to their belly hairs.

7. *Macropus antilopinus* Gould.

♀ 525. Burnndie.

♂ 526. Edith River.

♂ 528, 529, 531. ♀ 530. Margaret River.

♂ 665, 669, 671, 678, 1442, 1454, 1459, 1462. ♀ 670, 672, 1444, 1448, 1449, 1452, 1457, 1461, 1463. South Alligator River.

♂ 1036. ♀ 1035. Eureka.

♀ 1465. Union River Creek.

It is a curious fact that in the wearing down and crushing of the anterior cheek teeth so marked in this Kangaroo the small and delicate "p 4" often stands its ground after the much larger first molar succeeding it has been worn down or dropped out. The anomalous condition of a jaw possessing a premolar followed by three molariform teeth only may therefore occasionally be found.

The striking sexual difference in the pattern of coloration in this Kangaroo is worthy of special remark, for at first sight the two sexes appear to be of different species. Gould's figure in his *Monograph of Macropodidae* shows very well the dark crown, greyish face and parti-coloured ears of the female, but the same plate as republished in the *Mammals of Australia* has been spoilt in the colouring, the head being hopelessly wrong in several respects, notably in the sharp separation of the upper from the lateral colour of the head, and in the ground colour of the cheeks. Nor is the enlarged figure of the head in the same work any better. On the other hand, the uniform foxy red of the head and ears of the male is well shown in both works.

8. *Macropus robustus alligatoris* subsp. nov.

♂. No. 1455. July 2nd, 1903. South Alligator River.

Type: "Chackarn" of natives. "Iris brown,"—J. T. T.

Fur nearly as short and close as in *M. r. woodwardi*, much shorter than in the other subspecies. Hairs of centre of fore-back and nape reversed forwards to the crown from a whorl on the withers, as in *M. r. woodwardi*.* General colour somewhat as in *M. r. erubescens*, but less richly rufous above, and duller below; fore-back a dull vinaceous fawn, darkening to a brownish fawn on the rump. Neck, crown, and back of ears like fore-back, long hairs of inner side of ears whitish. Muzzle and cheeks dull brown, an indistinct whitish whisker mark present. Centre of chin with a prominent dull brown patch. Throat, chest and belly dull brownish white, passing laterally and below into vinaceous fawn. Arms like fore-back, darkening on the digits nearly to black; hind-limbs proximally like the rump; the

* At least this is the case in the type, but Dr. Collett informs me that the fur in his two specimens (female and young) is directed as in *M. r. erubescens*.

feet paler fawn, but becoming dark reddish brown on the base, and black on the ends of the central digits. Tail short-haired, dull fawn, its base whitish below.

Skull as in other members of the *robustus* group.

Approximate dimensions of the type, measured on the skin :—

Head and body, 1100 mm.; tail, 850; hindfoot s.u. 283, c.u. 296; ear, 195.

Skull, greatest length 175 mm., basal length 155; greatest breadth 91; nasals 66×26 ; constriction 16; diastema 34; palate length 107; combined length of three posterior cheek teeth, 37 mm.

This fine Kangaroo, the representative of *M. robustus* in North Australia, is most nearly allied to the South Australian *erubescens*, but it is duller-coloured, both above and below, has fawn-coloured instead of blackish backs to its ears, and has shorter fur. The type, as in *M. r. woodwardi*, has its nuchal hairs reversed, but this character would seem to be inconstant.

9. *Macropus bernardus* Rothschild.

Dendrodorcopsis woodwardi Rothschild *Nor. Zool.* 1904. p. 414 (*nec Macropus robustus woodwardi* Thos., 1901).

Macropus bernardus id., op. cit. No. 4.

♂ 1443, 1445, 1480, 1481, 1482, 1483, 1484, 1485. S. Alligator River.

"Caught in high granite ranges; difficult to procure."

Deceived by the peculiar *Dendrolagus*-like look of this interesting black (or rather chocolate-coloured) Kangaroo, Mr. Rothschild formed a special genus for its reception; but he has since rightly recognised that it should be considered a member of the genus *Macropus*.

It is, however, none the less a most striking and remarkable discovery, the finest that has been made in Australia for many years, and the organisers of Mr. Tunney's expedition are to be congratulated on so valuable a result.

The skull of *M. bernardus* is very like that of *M. robustus*; it is, however, smaller, more lightly built, and notably lower in side view, the height of the muzzle at the diastema and of the brain-case and pterygoids being both markedly less. The posterior nares are in consequence also much lower. The nasal notch is somewhat deeper, the overhang of the nasals being about 15 mm., as against 11 mm. in the larger skull of *robustus*.

The dentition is quite normal, and the diagnostic teeth i^3 and the premolar are of the dimensions and structure of those of *M. robustus*.

The measurements of an adult *male* skull are as follows :—

Greatest length, 153; basal length, 139; greatest breadth, 85; nasals, length, 64, breadth behind, 24; constriction, 17; diastema, 31; palate length, 95; length of palatal foramina, 9; height of muzzle at anterior end of premolar, 26; height of posterior narial opening, 14 mm.

Teeth. *—Horizontal length of i^3 , 10; of " p^4 " (Catalogue notation), 8.5; of three anterior molariform teeth, 32 mm.

10. *Macropus agilis*, Gould.

♂ 1441. ♀ 1450, 1453, 1456, 1458, 1460, 1464. South Alligator River.

11. *Petrogale brachyotis*. Gould.

♂ 666, 1447. ♀ 1478. South Alligator River.

♂ 1167, 1169, 1170. ♀ 1165, 1166, 1168, 1171. Nellie Creek.

* In a younger specimen, with the teeth unworn.

12. *Peradorcas* (g. n.) *concinna* Gould.

♂ 1160, 1164. ♀ 1158, 1159. Nellie Creek. And two young, unlabelled. In granite ranges.

Up to the date of the Catalogue of Marsupials the only specimen of "*Petrogale*" *concinna* available for examination was the type, and, peculiar as the dentition seemed, it was impossible to determine whether or not this single specimen was abnormal.* Now, however, the study of Mr. Tunney's material, combined with a number of skulls obtained by Dr. Dahl and kindly lent by Dr. Collett, convinces me that this little Kangaroo should have a special genus formed for its reception.

It may be described as follows:—

General characters as in *Petrogale*, but the molars increased in number, seven at least on each side and probably more, falling out in front and renewed behind as in the Manatee (*Trichechus*).

Skull as described in the *Catalogue* (*l.c.*).

The above remarkable characteristic of the molar dentition, only found elsewhere in the Manatee,† is not easily seen on any single specimen, and has not therefore been previously recognised. A normal adult Kangaroo, whether *Petrogale* or other genus, has four molars,‡ increasing in size backwards, with a narrow p^4 in front of them, the latter having replaced a small similarly-shaped p^3 and a square mp^4 at the tooth-change. But in the type of *P. concinna*, which now proves to be quite normal, the most anterior tooth is molariform, and is succeeded by four other similarly-shaped teeth, with indications of where a fifth might have been later developed. This square anterior tooth, about which I expressed no opinion in the Catalogue, was definitely accepted by Dr. Collett § as " p^4 ." But now the true p^4 , as in other genera, proves to be a narrow cutting tooth, which is shed soon after eruption, and is therefore seldom found in position, the only case among the nine skulls before me being in skull No. 1318 of the Christiania Museum, where it was taken for p^3 by Dr. Collett.|| The young examples of the present collection prove this determination clearly, for below the normal narrow p^3 and square mp^4 an equally narrow p^4 can be extracted from the jaw.

Then, to solve the problem as to what the square front tooth of the type really is, a careful comparison of the sizes of the teeth, carried out on the same

* See *Cat. Mars. B. M.* p. 71. 1888.

† See Thomas & Lydekker, *P. Z. S.* 1897. p. 595. See also Hartlaub, *Zool. Jahrb.* i. p. 1. 1886.

‡ For the sake of clearness the numeration of the teeth, both molars and premolars, is here described as in the Catalogue and in Dr. Collett's paper—*i.e.*, as though the following were the formula—

$$P. \begin{pmatrix} 3. & 4 \\ & 4 \\ 4 & \end{pmatrix} \quad M \begin{pmatrix} 1. & 2. & 3. & 4 \\ 1. & 2. & 3. & 4 \end{pmatrix}$$

but later researches (cf. Lydekker, *P. Z. S.* 1899. p. 922) indicate that the formula should rather be—

$$P. \begin{pmatrix} 3 \\ 2. & 3. & 4. \\ 2. & 3. & 4. \\ & 3. \end{pmatrix} \quad M. \begin{pmatrix} 1. & 2. & 3. \\ 1. & 2. & 3. \end{pmatrix}$$

Later again (*Tr. Linn. Soc.* 1904), Mr. Bensley does not accept the latter interpretation, so that the provisional retention of the catalogue formula is the more advisable.

§ *P. Z. S.* 1897. p. 326.

|| This tooth is 5.0 mm. in length, P^3 being only about 4.1.

lines as in the paper on the Manatee (above quoted), indicates that this tooth cannot **possibly** have been anterior to m^3 , and is probably much farther back in the series. But even if it is m^3 , the four teeth behind it bring up the total to seven as a minimum, while there is no indication to show that the number is not far more, as indeed I think to be the case. The oldest specimen before me has not ceased to produce fresh teeth behind, the general tooth-row has the peculiar parallel-sidedness characteristic of the Manatee, and theoretically it is only natural that, if the continuous growth of additional teeth gets once started, it might go on throughout the life of the animal.

How any more exact knowledge of the number of teeth actually produced and shed is to be obtained I do not know, for the teeth are too equal-sized for the method used with the Manatee (and very vague then) to be of any further use. The only possibility would be for a young specimen in captivity to have its most posterior tooth marked, and then a later examination would show how many and at what rate further teeth came up behind the marked one.

That a single form in the large family Macropodidae should have taken on this remarkable specialisation in tooth development is a most interesting fact, and is strongly confirmatory of the views as to the non-primitiveness of the Manatee's dentition put forward by Mr. Lydekker and myself in the paper above referred to.

13. *Onychogale unguifera* Gould.

♀ 533. Brock's Creek.

14. *Trichosurus vulpecula arnhemensis* Coll.

♂ 520, 524. ♀ 521, 1519. Hall's Creek.

♂ 667, 1351, 1510. South Alligator River.

♂ 1040, 1043, 1047, 1155, 1352, 1353. ♀ 1037, 1042, 1044, 1154, 1350; Eureka.

15. *Pseudochirus dahli* Coll.

♂ 1150, 1152, 1153, 1154. ♀ 1147, 1148, 1149, 1151. Nellie Creek.

♂ 1491, 1493, 1494, 1496, 1497, 1498, 1501, 1503. ♀ 1354, 1490, 1492, 1495, 1499, 1500, 1502, 1504. South Alligator River.

16. *Petaurus breviceps* Waterh.

♂ 1429, 1431, 1434, 1436, 1437, 1438. ♀ 1428, 1430, 1432, 1433, 1435, 1439, 1440, 1509. South Alligator River.

Topotypical of *P. ariel* Gould.

17. *Perameles macrura* Gould.

♂ 682, 1411. South Alligator River.

Three without particulars.

18. *Perameles aurata* Rams.

♂ 677, 1390. ♀ 680. South Alligator River.

♂ 517. Hall's Creek.

Five skins without particulars.

These specimens represent a small form allied to *P. obesula*, to which latter

species Dr. Collett referred the examples collected by Dr. Dahl. Not knowing of any bandicoot of this type from North Australia in 1888, I placed *auratus* as a synonym of *macrura* in the Catalogue of Marsupials, but I now owe to the kindness of Mr. E. R. Waite the measurements of the typical skull preserved in the Macleay Museum at Sydney, and these show that it belongs to the *obesula* group. The following are the most important measurements of Dr. Ramsay's type, as sent by Mr. Waite :—

Greatest breadth of skull 23·5 : nasals 19·2 × 4·0 ; palate, length 28·1, breadth outside m^3 14·4, inside m^3 9·0 ; palatal foramen 5·4 ; basi-facial axis 39·0 ; teeth, canine to m^4 19·6, length of p^1 2·2, molars 1^1 3·8, 2^1 8·7.

These measures correspond closely with some of the smaller examples of the present series, so that, in the absence of topotypes, it seems advisable to use Dr. Ramsay's name. The small species from Barrow Island differs from these specimens by the smaller size of its bullae.

The young skin from Victoria River, Northern Territory, presented by Dr. J. R. Elsey in 1857, and referred in the catalogue to *P. macrura* (specimen *e*) proves on the extraction of its skull to be an example of the present species.

P. aurata, besides its conspicuously smaller size, is of a somewhat richer and more fulvous colour than *P. macrura*.

19. *Dasyurus hallucatus* Gould.

♂ 1140, 1142, 1143. ♀ 1135, 1141, 1144. Nellie Creek.

♂ 1355, 1357, 1358. ♀ 1359, 1360. South Alligator River.

20. *Phascogale penicillata pirata* subsp. nov.

♂ 1388, 1410. ♀ 1402, 1404. South Alligator River.

One without label.

General characters and appearance of the true *Ph. penicillata*, but smaller, paler and with certain tooth differences.

Size markedly less than in *penicillata*, as shown by the skull dimensions. General colour above "smoke-grey" (Ridgway), therefore considerably paler than the dark cinereous grey of *penicillata*. Under-surface dull whitish, not sharply defined laterally ; the hairs mostly grey at their bases. Outer side of limbs grey, like flanks ; inner side whitish, like belly ; upper surface of hands and feet white, with an occasional slight encroachment of brown on to the metapodials. Tail drab-grey or brownish grey for about two inches at its base, the remainder broadly tufted with black.

Skull very like that of *penicillata*, though markedly smaller ; nasals rather broader in proportion, supraorbital edges more strongly ridged ; bullae smaller.

Teeth : Incisors less disproportionate than in *penicillata* ; i^1 rather smaller, and i^2 but little larger than i^3 and i^4 ; the enamel-covered portion of i^2 is only about 1·2 mm. in vertical diameter, as compared with about 2 mm. Similarly below the crown of the anterior incisor only measures about 1·5 mm. horizontally, as against 2·3. Last lower premolar little or not smaller than the first, while it is conspicuously smaller in *Ph. penicillata*.

Dimensions of the type, measured in skin :—

Head and body, 200 ; tail, 180 ; with hairs, 205 ; hindfoot, 32 mm. Skull (of Dr. Elsey's specimen) : basal length, 42 ; zygomatic breadth, 27·5 ; nasals,

16 × 7·5 ; intertemporal breadth, 7 ; palatal foramina, 3·6 × 3 ; palate length, 24 ; length of their anterior molariform teeth, 8·1.

Type : Male, No. 210. Captured May 24th, 1903.

This subspecies is in general appearance exceedingly like the common Brush-tailed Phascogale of temperate Australia, but may be distinguished by the characters above given. A skeleton of it was obtained by Dr. J. R. Elsey during the North Australian Expedition, and was presented by him to the National Museum in 1854. Other examples were collected by Dr. Dahl.

21. *Phascogale bella* spec. nov.

♂ 1401, 1407. ♀ 1405. South Alligator River.

A pale member of the *Ph. flavipes* group.

Size rather larger than in *Ph. flavipes*. Fur close and fine, less woolly than in the allied species ; hairs of back about 6 mm. in length. General colour above, of head, back and sides, a beautiful pale pinkish fawn, nearest to, but darker than, Ridgway's "ecru drab," the rump slightly darker than the fore back. Under surface white, more or less tinged with drab, the slaty bases to the hairs showing through ; line of demarcation on sides fairly well defined. Eyes with lighter marks above and below them. Upper surface of hands and feet white. Tail proportionally longer than in *Ph. flavipes*, well-haired, cylindrical ; its base hairy and coloured like the back ; the middle line of its upper surface pale brownish, its tips inconspicuously blackened and pencilled ; its sides and under surface white.

Skull with the essential characters of that of *Ph. flavipes*, as used in the synopsis in the Catalogue of Marsupials. It is, however, larger, broader and flatter ; interorbital region narrower and more sharply edged ; tympanic portion of bullae larger. Palatal foramen to the centre of the canines.

Teeth as in *Ph. flavipes*, the anterior incisor similarly thrown forward away from the others ; last upper premolar rather more exceeding the anterior ones ; last lower premolar intermediate in size between the large middle and the small anterior one.

Dimensions of the type, measured in skin :—

Head and body, 114 mm. ; tail, 108 ; hindfoot, 22 ; ear, 17. Skull : greatest length, 31 ; basal length, 28 ; zygomatic breadth, 18 ; nasals, 11 × 3·7 ; interorbital breadth, 5·6 ; palate length, 16 ; combined length of three anterior molariform teeth, 5·6.

Hab. South Alligator River.

Type : Male, No. 1407. Collected May 25th, 1903.

This very pretty little Pouched Mouse looks externally so entirely different from the common *Ph. flavipes*, that one would not suspect any close affinity between the two, but the skull and dentition are essentially similar to those of that species.

In one of the specimens the crown is a great deal darker than the back, but this appears to be due to change of fur.

22. *Tachyglossus aculeatus* Shaw.

♀ 1132, 1134, and one unlabelled. Nellie Creek.
